

Exemption No. 10072

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
WASHINGTON, DC 20591

In the matter of the petition of

**TERRAFUGIA, INC.**

for an exemption from § 1.1 of  
Title 14, Code of Federal Regulations

Regulatory Docket No. FAA-2009-1087

**PARTIAL GRANT OF EXEMPTION**

By letter dated November 12, 2009, Mr. Carl Dietrich, Terrafugia, Inc., 5 Cranes Court, Woburn, MA 01801, petitioned the Federal Aviation Administration (FAA) for an exemption from § 1.1 of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would allow the Terrafugia Transition® roadable aircraft to be eligible for the issuance of a special airworthiness certificate in the light-sport category with an additional weight allowance for a four wheel light-sport aircraft (LSA) with folding wings intended for operation on public roadways (i.e., roadable aircraft).

**The petitioner requests relief from the following regulation:**

Although the petitioner requests an exemption from § 1.1, we find instead, for the operations requested, the petitioner will need an exemption from § 21.190(c)(2), which prescribes that:

(c) *Manufacturer's statement of compliance for light-sport category aircraft.* The manufacturer's statement of compliance required in paragraph (b)(1)(iii) of this section must—

(2) State that the aircraft meets the provisions of the identified consensus standard;

**The petitioner supports its request with the following information:**

The petitioner seeks airworthiness certification in the special light-sport aircraft (SLSA) category under the ASTM International (ASTM) light-sport airplane consensus standards for its Transition® roadable aircraft. For their roadable design to meet the applicable Federal Motor Vehicle Safety Standards (FMVSS) and still maintain a useful load equivalent to other LSA, the petitioner has requested a maximum takeoff weight (MTOW) of 1,474 pounds (670 kg).

The petitioner states that aircraft designed for dual use operation have a higher minimum empty weight due to the design requirements of a vehicle with two very distinctive needs. Additional systems are needed in a roadable LSA to provide dual functionality similar to LSA intended for operation on water. These systems include, but are not limited to, a ground drive system independent of the propeller (such as a transmission and differential), automotive lighting, signals, suspension, brakes, mirrors and windshield wipers. The requested increased weight of 1,474 pounds (670 kg) is due to the addition of structure and components for these systems that not only provide increased functionality, but also allow for the safe operation of the aircraft in both transportation modes. The additional safety features required for an automobile (such as side impact protection, roll cages and head restraints) also add to the increased weight of the aircraft.

The petitioner states that while the additional safety features incorporated into the structure of the aircraft offer protection to the pilot in emergency landing scenarios they do not add any complexity to the operation of the aircraft. The petitioner believes that by giving pilots the option of diverting and safely continuing their trip on the ground, a roadable LSA reduces the temptation to fly in marginal weather conditions. This has the potential to significantly reduce the number of visual flight rules (VFR) into instrument meteorological conditions (IMC) accidents and their resulting fatalities. Incorporating proven automotive crash safety features into aircraft fuselages could help reduce fatalities from accidents of all causes.

A summary of the petition was published in the Federal Register on March 4, 2010, (75 FR 42) and was assigned Docket Number FAA-2009-1087. The FAA received comments from four commenters. All comments were in favor of the relief requested by Terrafugia. Every commenter supported the petitioner's request for weight allowance for safety items to meet the Federal Motor Vehicle Safety Standards (FMVSS) for a roadable special category LSA.

**The FAA's analysis is as follows:**

The FAA reviewed Terrafugia's petition and supporting information, as well as information provided in comments submitted in response to the publication of a summary of the petition in the Federal Register. After careful consideration, we find a partial grant of exemption, subject to specific conditions and limitations, would provide an equivalent level of safety to that of the regulation and would serve the public interest. This partial grant is for increased weight to accommodate roadable aircraft meeting the FMVSS requirements and is not intended to provide a weight increase for traditional configurations under LSA. The following is a summary of the FAA's analysis of Terrafugia's petition for exemption.

The petitioner seeks an exemption so it can certificate its Transition® roadable aircraft with a special airworthiness certificate in the light-sport category. The SLSA category was created in 2004 with a 1,320 pound (600 kg) weight limit to provide for the manufacture of new aircraft conforming to acceptable consensus standards. The "Certification of Aircraft and Airmen for the Operation of Light-Sport Aircraft" final rule

(69 FR 44772) (sport pilot rule) was meant to address new sport and recreational aircraft that previously lacked suitable certification guidelines.

In the preamble of the Notice of Proposed Rulemaking (NPRM), the FAA stated that it intended the rule to increase safety in the sport aircraft community by closing the gaps in existing regulations and by accommodating new advances in technology. Included was the development of consensus standards to address the unique design, production and continued operational safety aspects of light-sport category aircraft.

As a member of the consensus standard body, the FAA can call for revisions to the consensus standard when the agency determines such revisions are necessary. The FAA, as all other participants, may propose changes to amend the consensus standards to address new technology, applications, or deficiencies. As part of the FAA's participation in the consensus standards development, the FAA will review proposed consensus standards prior to the issuance of a Notice of Availability (NOA).

Each SLSA aircraft design must meet the consensus standards acceptable to the FAA. However, the existing consensus standards for LSA do not yet address roadable aircraft. The intent is for new or novel concepts in light-sport to gain operational experience as experimental aircraft while working with the ASTM F37 Committee for Light Sport Aircraft to develop the standards needed to address new or novel concepts. Terrafugia is currently working with ASTM to accomplish this goal.

The FAA has an established precedence for allowing 1,430 pounds (650 kg) under LSA intended for operation on water, which also have unique configuration characteristics that justify an increase in MTOW above the original 1,320 pound (600 kg) LSA limit. This petition is significantly different from previous requests for exemption to the LSA MTOW limitations, as the Transition® roadable aircraft design is unique and must simultaneously meet both sets of standards for ASTM and FMVSS.

A partial grant of exemption by the FAA would allow certification of the Transition® as a roadable aircraft with a MTOW of 1,430 pounds (650 kg); otherwise, the aircraft would be required to meet acceptable consensus standards for conventional configuration SLSA aircraft with MTOW of 1,320 pounds (600 kg). We reviewed the information provided by Terrafugia, as well as that provided by the commenters to the petition for exemption. The FAA agrees with the commenters who inferred the safety of roadable aircraft is better served by allowing for the weight increase for safety features required for use while driving on the road. However, the FAA does not intend to extend this exemption to conventional configuration LSA for safety enhancing equipment (i.e., roll cages, ballistic parachutes, etc.).

The data submitted by the petitioner supports the assertion for roadable aircraft, accidents in airplanes equipped with NHTSA-required safety features are more survivable than in similar airplanes without NHTSA-required safety features. The FAA intends to cooperate

with industry efforts to determine if appropriate design constraints in the consensus standards can further guarantee that roadable LSA have appropriate safeguards in the event of a failure in the transition from road to flight configuration.

We find that, with the conditions and limitations specified, this exemption provides an equivalent level of safety to that of an aircraft that has been issued a special airworthiness certificate in the light-sport category.

#### **The FAA's Decision:**

In consideration of the foregoing, I find that a partial grant of exemption that grants relief to Terrafugia from having to meet the requirement of 1,320 pounds (600 kg) maximum takeoff weight (MTOW) for certification and operation of roadable LSA is in the public interest. However, I do not find that a grant of exemption is in the public interest for the certification of roadable LSA operating at 1,474 pounds (670 kg) MTOW. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator, Terrafugia, Inc. is hereby granted an exemption from 14 CFR § 21.190(c)(2) to the extent necessary to allow Terrafugia Transition® aircraft, that otherwise meet the requirements of § 21.190, to be eligible for issuance of a special airworthiness certificate in the light-sport category, having a MTOW of not more than 1,430 pounds (650 kg).

#### **Conditions and Limitations**

1. This partial grant of exemption applies only to the Terrafugia Transition® aircraft.
2. Terrafugia, Inc. must supply each purchaser of a Transition® aircraft with a copy of this exemption. A copy of the exemption must be carried on board each Transition® aircraft certificated under the provisions of this exemption.
3. Terrafugia must maintain a record of all owners of the Transition® aircraft certificated under the provisions of this exemption.

Issued in Kansas City, MO, on May 27, 2010.



Kim Smith, Manager  
Small Airplane Directorate  
Aircraft Certification Service